Apprenticeship and Industry Training

Crane and Hoisting Equipment Operator
Tower Crane

Apprenticeship Course Outline

34-2-01.2 (2001)

Government of Alberta ■

Apprenticeship and Industry Training

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Crane and Hoisting Equipment Operator—Tower Crane
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Course Outline

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Apprenticeship

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding an employer. Employers hire apprentices, pay their wages and provide on-the-job training and work experience. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyperson or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution – usually a college or technical institute.

To become certified journeypersons, apprentices must learn theory and skills, and they must pass examinations. Requirements for certification—including the content and delivery of technical training—are developed and updated by the Alberta Apprenticeship and Industry Training Board on the recommendation of Crane and Hoisting Equipment Operator—Tower Crane Provincial Apprenticeship Committee.

The graduate of the Crane and Hoisting Equipment Operator—Tower Crane apprenticeship program is a certified journeyperson who will be able to:

- operate and describe functions of the major and minor components of tower cranes
- recognize and identify malfunctions and the proper procedures related thereto
- recognize and evaluate conditions which are potentially hazardous to safe machine operation
- interpret and apply load chart and related documentation
- work in conjunction and communicate with other trades, employers and customers
- interpret and apply visual and audio communication
- perform assigned tasks in accordance with quality and production standards required by industry
- perform assigned tasks in accordance with quality and production standards required by industry

Apprentice hip and Industry Training System

Industry-Driven

Alberta's apprenticeship and industry training system is an industry-driven system that ensures a highly skilled, internationally competitive workforce in more than 50 designated trades and occupations. This workforce supports the economic progress of Alberta and its competitive role in the global market. Industry (employers and employees) establishes training and certification standards and provides direction to the system through an industry committee network and the Alberta Apprenticeship and Industry Training Board. The Alberta government provides the legislative framework and administrative support for the apprenticeship and industry training system.

Alberta Apprenticeship and Industry Training Board

The Alberta Apprenticeship and Industry Training Board provides leadership role in developing Alberta's highly skilled and trained workforce. The board's primary responsibility is to establish the standards and requirements for training and certification in programs under the Apprenticeship and Industry Training Act. The board also provides advice to the Minister of Advanced Education and Technology on the needs of Alberta's labour market for skilled and trained workers, and the designation of trades and occupations.

The thirteen-member board consists of a chair, eight members representing trades and four members representing other industries. There are equal numbers of employer and employee representatives.

Industry Committee Network

Alberta's apprenticeship and industry training system relies on a network of industry committees, including local and provincial apprenticeship committees in the designated trades, and occupational committees in the designated occupations. The network also includes other committees such as provisional committees that are established before the designation of a new trade or occupation comes into effect. All trade committees are composed of equal numbers of employer and employee representatives. The industry committee network is the foundation of Alberta's apprenticeship and industry training system.

Local Apprenticeship Committees (LAC)

Wherever there is activity in a trade, the board can set up a local apprenticeship committee. The board appoints equal numbers of employee and employer representatives for terms of up to three years. The committee appoints a member as presiding officer. Local apprenticeship committees:

- monitor apprenticeship programs and the progress of apprentices in their trade, at the local level
- make recommendations to their trade's provincial apprenticeship committee (PAC) about apprenticeship and certification in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- make recommendations to the board about the appointment of members to their trade's PAC
- help settle certain kinds of disagreements between apprentices and their employers
- carry out functions assigned by their trade's PAC or the board

Provincial Apprenticeship Committees (PAC)

The board establishes a provincial apprenticeship committee for each trade. It appoints an equal number of employer and employee representatives, and, on the PAC's recommendation, a presiding officer - each for a maximum of two terms of up to three years. Most PACs have nine members but can have as many as twenty-one. Provincial apprenticeship committees:

- Make recommendations to the board about:
    - standards and requirements for training and certification in their trade
    - courses and examinations in their trade
    - apprenticeship and certification
    - designation of trades and occupations
    - regulations and orders under the Apprenticeship and Industry Training Act
- monitor the activities of local apprenticeship committees in their trade
- determine whether training of various kinds is equivalent to training provided in an apprenticeship program in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- consult with other committees under the Apprenticeship and Industry Training Act about apprenticeship programs, training and certification and facilitate cooperation between different trades and occupations
- consult with organizations, associations and people who have an interest in their trade and with employers and employees in their trade
- may participate in resolving certain disagreements between employers and employees
- carry out functions assigned by the board

Crane and Hoisting Equipment Operator—Tower Crane PAC Members at the Time of Publication

Mr. R. Schram	Edmonton	Presiding Officer
Mr. R. Ross	Calgary	Employer
Mr. D. Cadotte	Edmonton	Employer
Mr. G. Chaba	Edmonton	Employer
Mr. L. Tucker	Edmonton	Employer
Mr. D. House	Fort McMurray	Employer
Mr. G. Rusling	Vermilion	Employer
Mr. M. McDonnell	Edmonton	Employee
Mr. J. Penner	Edmonton	Employee
Mr. M.Timmer	Edmonton	Employee
Mr. J. Lane	Fort McMurray	Employee
Mr. A. Lawler	Fort McMurray	Employee
Mr. L. Schnepf	Red Deer	Employee

Alberta Government

Alberta Advanced Education and Technology works with industry, employer and employee organizations and technical training providers to:

- facilitate industry's development and maintenance of training and certification standards
- provide registration and counselling services to apprentices and employers
- coordinate technical training in collaboration with training providers
- certify apprentices and others who meet industry standards

Technical Institutes and Colleges

The technical institutes and colleges are key participants in Alberta's apprenticeship and industry training system. They work with the board, industry committees and Alberta Advanced Education and Technology to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs. They develop lesson plans from the course outlines established by industry and provide technical training to apprentices.

Apprenticeship Safety

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, employers, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

Alberta Apprenticeship and Industry Training Board Safety Policy

The Alberta Apprenticeship and Industry Training Board fully supports safe learning and working environments and encourages the teaching of proper safety procedures both within trade specific training and in the workplace.

Trade specific safety training is an integral component of technical training, while ongoing or general non-trade specific safety training remains the responsibility of the employer and the employee as required under workplace health and safety legislation.

Workplace Responsibilities

The employer is responsible for:

- training employees and apprentices in the safe use and operation of equipment
- providing and maintaining safety equipment, protective devices and clothing
- enforcing safe working procedures
- providing safeguards for machinery, equipment and tools
- observing all accident prevention regulations

The employee and apprentice are responsible for:

- working in accordance with the safety regulations pertaining to the job environment
- working in such a way as not to endanger themselves, fellow employees or apprentices

Workplace Health and Safety

A tradesperson is often exposed to more hazards than any other person in the work force and therefore should be familiar with and apply the Occupational Health and Safety Act, Regulations and Code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Workplace Health and Safety (Alberta Employment, Immigration and Industry) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at www.worksafely.org

Technical Training

Apprenticeship technical training is delivered by the technical institutes and many colleges in the public post-secondary system throughout Alberta. The colleges and institutes are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All training providers place great emphasis on safe technical practices that complement safe workplace practices and help to develop a skilled, safe workforce.

Procedures for Recommending Revisions to the Course Outline

Advanced Education and Technology has prepared this course outline in partnership with the Crane and Hoisting Equipment Operator—Tower Crane Provincial Apprenticeship Committee.

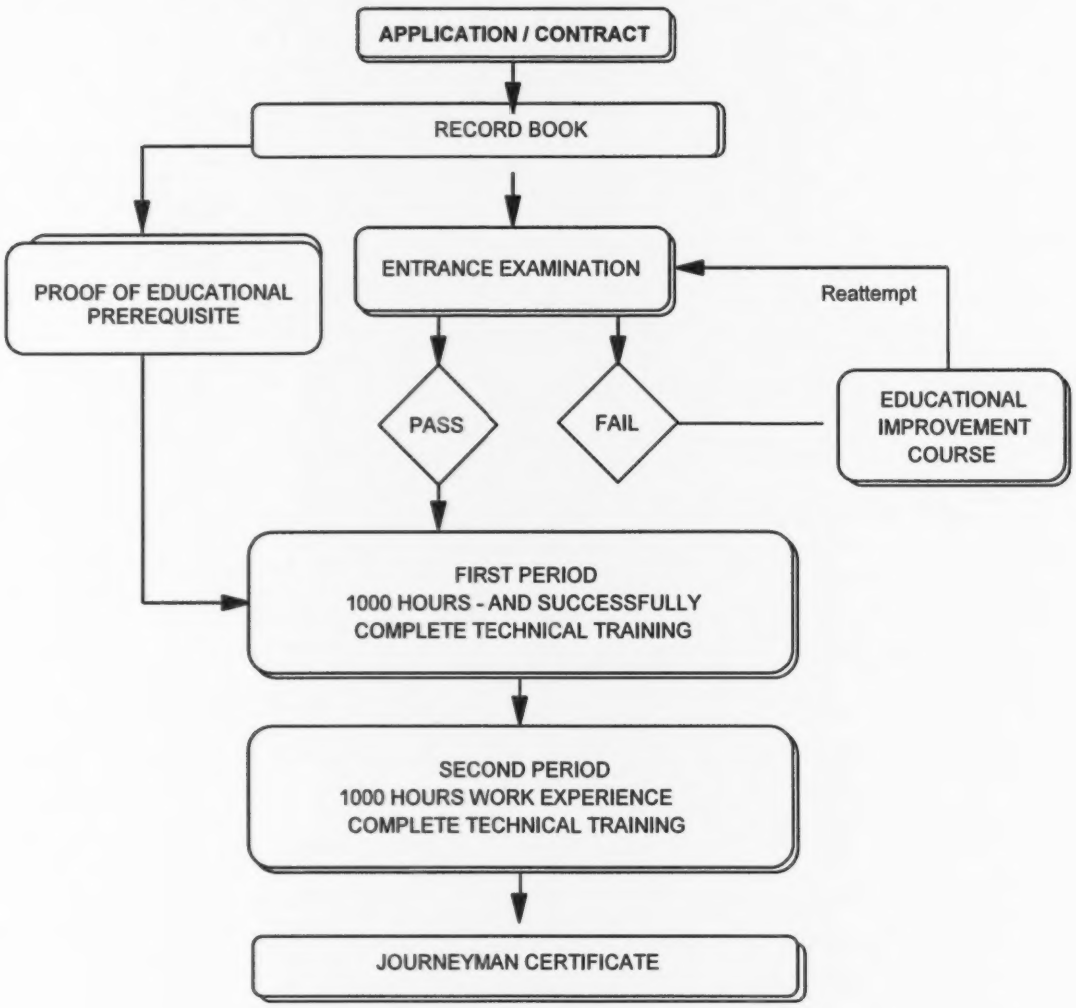
This course outline was approved on May 28, 2001 by the Alberta Apprenticeship and Industry Training Board on a recommendation from the Provincial Apprenticeship Committee. The valuable input provided by representatives of industry and the institutions that provide the technical training is acknowledged.

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Crane and Hoisting Equipment Operator—Tower Crane Provincial Apprenticeship Committee
c/o Industry Programs and Standards
Apprenticeship and Industry Training
Advanced Education and Technology
10th floor, Commerce Place
10155 102 Street NW
Edmonton AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations for change will be placed on the agenda for regular meetings of the Crane and Hoisting Equipment Operator—Tower Crane Provincial Apprenticeship Committee.

Apprenticeship Route toward Certification



Crane and Hoisting Equipment Operator—Tower Crane Training Profile
FIRST PERIOD
(5 Weeks 30 Hours per Week - Total of 150 Hours)

SECTION ONE

PROTECT SELF AND OTHERS

Page 10 — **14 HOURS**

A	B	C
Personal Protective Equipment	Safety Awareness In Tower Crane Operation	Maintain A Safe Work Environment
D	**E**	**F**
Working Around And Contact With High Voltage	Responsibilities	Workplace Coaching Skills
G	**H**	**I**
Maintain Guards, Covers And Levels	Emergency Rescue Procedures	Ascending And Descending A Tower Crane Safely
J	**K**	**L**
Weather Conditions Affecting Tower Crane Operation	Fire Safety Procedures	Signals Used For Tower Crane Operation

SECTION TWO

TYPES, COMPONENTS, AND TERMS

Page 13 — **4 HOURS**

A	B	C
Types Of Cranes	Components Of Tower Cranes	Terms Related To Tower Cranes

SECTION THREE

CONDUCT A PRE-OPERATIONAL INSPECTION

Page 13 — **12 HOURS**

A	B	C
Reference Material Interpretation	Perform A Pre-Operation Inspection	Perform A Detailed Structural Inspection
D	**E**	**F**
Perform A Detailed Mechanical Inspection	Perform A Detailed Electrical Inspection	Inspect Tower Crane Support Components
G	**H**	**I**
Inspect Tower Crane (Track Travel) Components	Perform A Function Test	Maintain A Tower Crane Logbook

SECTION FOUR

PLAN LIFTS

Page 15 — **20 HOURS**

A	B	C
Lift Plan Reference Material Interpretation	Elements Of A Lift Plan	On-Site Communication
D	**E**	**F**
Determining The Gross Load	Determining Tower Crane Capacity	Select A Crane Configuration
G	**H**	
Lifting Personnel	Special Lift Preparation	

SECTION FIVE

PRE-LIFT PLANNING AND RIGGING

Page 17 — **30 HOURS**

A	B	C
Determine Safe Working Loads	Inspect Rigging Equipment	Wire Rope Inspection

SECTION SIX

OPERATE HAMMERHEAD CRANES

Page 19 **34 HOURS**

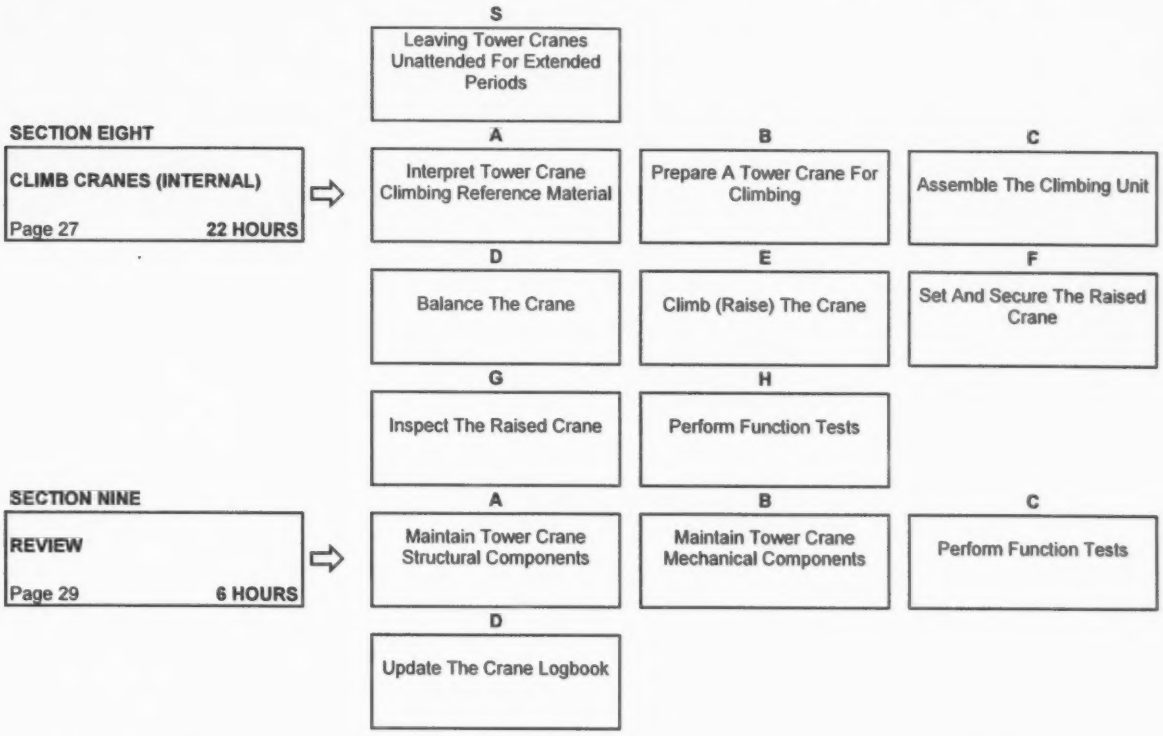
D	E	F
Wire Rope Component Inspection	Lubricate Wire Rope	Inspect Lifting Devices
G	H	I
Select Rigging Equipment	Perform Rigging	Maintain And Store Rigging Equipment
A	B	C
Interpret Operating Manuals	Program On-Board Computer Systems	Perform Pre-Operation Checks
D	E	F
Perform Trolley Travel Operations Without A Load	Perform Trolley Travel Operations With A Load	Perform Slewing Operations Without A Load
G	H	I
Perform Slewing Operations With A Load	Perform Hoisting Operations Without A Load	Perform Hoisting Operations With A Load
J	K	L
Perform Crane Travel Operations Without A Load	Perform Crane Travel Operations With A Load	Perform All Crane functions Simultaneously Without A Load
M	N	O
Perform All Crane Functions Simultaneously With A Load	Leaving Tower Crane Unattended For Short Periods	Leaving Tower Cranes Unattended For Extended Periods

SECTION SEVEN

OPERATE LUFFER CRANES

Page 23 **8 HOURS**

A	B	C
Interpret Operating Manuals	Program On-Board Computer Systems	Perform Pre-Operational Checks
D	E	F
Perform Luffing Operations Without A Load	Perform Luffing Operations With A Load	Perform Slewing Operations Without A Load
G	H	I
Perform Slewing Operations With A Load	Perform Hoisting Operations Without A Load	Perform Hoisting Operations With A Load
J	K	L
Perform Luff/Boom Up-Hoist Down Operations Without A Load	Perform Luff/Boom Up-Hoist Down Operations With A Load	Perform Luff/Boom Down-Hoist Up Operations Without A Load
M	N	O
Perform Luff/Boom Down-Hoist Up Operations With A Load	Perform Crane Travel Operation Without A Load	Perform Crane Travel Operations With A Load
P	Q	R
Perform All Crane Functions Simultaneously Without A Load	Perform All Crane Functions Simultaneously With A Load	Leaving Tower Cranes Unattended For Short Periods



NOTE: The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training.

FIRST PERIOD TECHNICAL TRAINING
CRANE AND HOISTING EQUIPMENT OPERATOR—TOWER CRANE TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE: ..... PROTECT SELF AND OTHERS ..... 14 HOURS

A. Personal Protective Equipment

1. Wear appropriate personal PPE on work site and apply all O H & S rules and regulations related to PPE.
2. Don a safety harness.
3. Adjust a safety harness to fit properly.
4. Wear PPE as required.
5. Maintain PPE as appropriate.

B. Safety Awareness in Tower Crane Operation

1. Demonstrate the ability to operate a crane in a safe work environment in accordance with O H & S.
2. Explain the precautionary procedures used to determine whether or not a load is stuck or frozen.
3. Identify unsafe workplace conditions.
4. Demonstrate how to report unsafe workplace conditions to the appropriate personnel.
5. Explain when to communicate with utility companies about craning activities.
6. Explain how to communicate with utility companies about craning activities.
7. State the operator's responsibilities in maintaining a safe work environment:
   a) awareness
   b) changing work situations
   c) proximity of other cranes and equipment
   d) working in blind areas

C. Maintain a Safe Work Environment

1. Maintain a safe working environment in accordance with O H & S.
2. Demonstrate knowledge of O H & S and company safety procedures.
3. Identify new hazards as they arise on a dynamic work site.
4. Demonstrate procedures for reporting new hazards to the appropriate personnel.
5. Describe/explain the role and purpose of the advisory network and provincial apprenticeship committee for the Crane and Hoisting Equipment Operator trade.
6. Identify obstructions to normal craning activities.
7. State procedures used to minimize the impact of obstructions.
8. State the criteria used to determine ground conditions.
9. Identify tower crane safety devices.

10. State the purposes for tower crane safety devices.
11. Describe the procedures for testing tower crane safety devices.
12. State the action to be taken when safety devices are not functioning.
13. Identify on-board crane operator aids, including load charts, operator's manual and log book, and ensure that they are applicable, legible and current for a given crane.
14. Record deficiencies and maintenance in appropriate log book.

D. Working Around and Contact with High Voltage

1. Demonstrate the ability to operate the crane safely near high voltage equipment in accordance with O H & S, local utilities and other government legislation.
2. State procedures for craning in proximity of overhead conductors.
3. State safe limits of approach to overhead conductors.
4. Perform a lift in proximity to simulated high voltage equipment.
5. Report contact with high voltage in accordance with O H & S.
6. State procedure to take when contact with high voltage occurs.
7. Given a simulated contact with a high voltage wire, perform the recommended sequence of actions.
8. Report crane contact with high voltage to supervisor.
9. State operator's responsibilities in reporting high voltage contact according to O H & S regulations.
10. Complete logbook entries recording a high voltage contact.

E. Responsibilities

1. Identify the responsibility of each person regarding operating procedures for a lift:
   a) crane operator
   b) rigger/signal person
   c) site supervisor
   d) maintenance person(s)
   e) crane owner

F. Workplace Coaching Skills

1. Describe the following coaching skills used for training apprentices:
   a) identify the point of the lesson
   b) link the lesson
   c) demonstrate a skill
   d) provide opportunity to practice a skill
   e) give feedback to the learner
   f) assess the learner's progress

G. Maintain Guards, Covers and Labels

1. Have the ability to understand warning labels and perform minor maintenance in accordance with O H & S.
2. State the purpose of warning labels.
3. Interpret warning labels.

4. Identify machinery guards and covers for a given crane.
5. Ensure that all safety guards, covers and devices are in place, serviceable and functioning properly for a given crane.
6. Report deficiencies to supervisor.
7. Repair defective component when practicable for a given crane.
8. Recommend maintenance or replacement of defective component for a given crane.
9. Record deficiencies and maintenance in appropriate log book.

H. Emergency Rescue Procedures

1. Have the ability to respond efficiently to an emergency rescue in accordance with O H & S.
2. State the step-by-step procedures to be taken in the event of an emergency rescue situation from a tower crane.
3. Identify and locate the rescue box.
4. Given a simulated emergency scenario, perform the recommended sequence of actions.

I. Ascending and Descending a Tower Crane Safely

1. Have the ability to ascend and descend a crane safely in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the use of the three-point contact method.
3. State the precautionary measures to be taken when climbing or descending a crane in adverse weather conditions.
4. Demonstrate how to exit the crane calmly and quickly in an emergency.
5. Discuss methods of carrying supplies and equipment up and down ladders.
6. Discuss the tower crane operator's responsibility regarding sanitation.

J. Weather Conditions Affecting Tower Crane Operation

1. Monitor and assess weather conditions to determine when to stop crane operations in accordance with manufacturer recommendations and O H & S.
2. State manufacturer's recommendations for operation in inclement weather for a given tower crane.
3. Demonstrate the ability to locate this information in the tower crane manual.
4. Demonstrate the ability to use an anemometer.
5. Demonstrate the ability to assess weather conditions and take the appropriate action.

K. Fire Safety Procedures

1. Demonstrate the ability to inspect the workplace and fire fighting equipment in accordance with O H & S.
2. Describe recommended fire safety procedures.
3. Identify various pieces of fire fighting equipment normally found on a work site.
4. Given a simulated tower crane fire, demonstrate the proper use of standard fire fighting equipment.
5. Inspect on-board fire fighting equipment for location and readiness.
6. Place appropriate barriers to prevent fire hazards where practicable.

L. Signals Used for Tower Crane Operation

1. Demonstrate the ability to interpret and obey signals in accordance with O H & S and job site requirements.
2. Demonstrate standard hand signals used during craning operations.
3. Identify the lift signaller.
4. Interpret instructions from a designated signaller using standard craning hand signals.
5. Demonstrate the use of two way electronic voice communication devices.
6. Interpret instructions from a designated signaller using two way electronic voice communication devices.
7. Demonstrate an understanding of an operation communication plan.

SECTION TWO: ..... TYPES, COMPONENTS, AND TERMS .....4 HOURS

A. Types of Cranes

1. Identify the common types of tower cranes.

B. Components of Tower Cranes

1. Identify components of tower cranes.
2. State the function of each component.

C. Terms Related to Tower Cranes

1. Define terms related to tower cranes.

SECTION THREE: .....CONDUCT A PRE-OPERATIONAL INSPECTION.....12 HOURS

A. Reference Material Interpretation

1. Have the ability to conduct an initial pre-operational inspection in accordance with manufacturer specifications, engineered drawing and O H & S.
2. Demonstrate the ability to locate the pre-operational procedures in the manufacturer's manual(s).
3. State sequence of inspection procedures according to manufacturer recommendations.
4. State location and function of controls.
5. State shut down procedure.
6. Confirm that the crane was erected according to manufacturer specifications and/or engineered drawing.
7. Confirm that all pertinent inspection and erection reports are completed and filed according to O H & S.

B. Perform a Pre-Operational Inspection

1. Have the ability to perform a daily pre-operational inspection of the mechanical, structural, electrical systems and components according to manufacturer specifications and O H & S.
2. Perform a visual check of mechanical, structural, electrical systems and components according to manufacturer recommendations.
3. Record results in the logbook.

4. Report defects to the appropriate personnel.

C. Perform a Detailed Structural Inspection

1. Demonstrate the ability to inspect the crane structure and components in accordance with manufacturer specifications and O H & S.
2. List the structural tower crane components that require inspection and state the inspection techniques for each.
3. Perform a detailed inspection on a given crane according to the manufacturer's recommendations and O H & S.
4. Record findings in the tower crane log book.
5. Report any deficiencies to the supervisor.

D. Perform a Detailed Mechanical Inspection

1. Demonstrate the ability to inspect the mechanical systems and components in accordance with manufacturer specifications and O H & S.
2. List the mechanical tower crane components that require inspection and state the inspection techniques for each.
3. Perform a detailed inspection on a given crane according to the manufacturer's recommendations and O H & S.
4. Record findings in the tower crane log book.
5. Report any deficiencies to the supervisor.

E. Perform a Detailed Electrical Inspection

1. Demonstrate the ability to perform a visual inspection of the electrical systems and components on a given crane in accordance with manufacturer specifications.
2. State the safety precautions to be taken before inspecting any electrical component.
3. List the electrical tower crane components that require inspection and state the inspection techniques for each.
4. Perform a detailed inspection on a given crane according to the manufacturer's recommendations.
5. Record findings in the tower crane log book.
6. Report any deficiencies to the supervisor.

F. Inspect Tower Crane Support Components

1. Demonstrate the ability to perform an inspection of the support structure and its components in accordance with manufacturer specifications, engineered drawings and O H & S.
2. Ensure the anchoring and/or support system is secured.
3. Perform an inspection of support structures and components for integrity.
4. State how to inspect shoring, bracing and wedging for integrity.
5. Discuss procedures for adjusting shoring, braces and wedges.

G. Inspect Tower Crane (Track Travel) Components

1. Demonstrate the ability to perform an inspection of the crane travel tracks and components in accordance with manufacturer specifications and O H & S.
2. List the components of a rail mounted tower crane carrier.
3. Discuss the inspection techniques for each including the tracks.
4. Record inspection and defects in logbook.
5. Report defects to appropriate personnel.
6. Demonstrate the ability to interpret engineered track layout drawings.

H. Perform a Function Test

1. Demonstrate the ability to perform a function test on the crane controls and safety devices in accordance with manufacturer recommendations, specifications and O H & S.
2. Discuss function test techniques.
3. Demonstrate function test procedures according to manufacturer's specifications.
4. Record inspection and malfunctions in logbook.
5. Report malfunctions to appropriate personnel.

I. Maintain a Tower Crane Logbook

1. Demonstrate the ability to maintain the crane logbook in accordance with O H & S.
2. State the information required to be recorded in the logbook according to O H & S.
3. Discuss logbook entries, including checks, statements and signatures.
4. Maintain a tower crane logbook.

SECTION FOUR: .....PLAN LIFTS.....20 HOURS

A. Lift Plan Reference Material Interpretation

1. Demonstrate the ability to plan lifts of various degrees of complexity using information normally available on a work site.
2. Demonstrate the ability to locate and interpret tower crane specifications from the manufacturer's manuals.
3. Demonstrate the ability to read and interpret a simple plan view layout diagram.
4. State the major criteria required to perform a planned lift safely:
   a) the lift plan
   b) daily Operations Schedule
   c) pre-Lift Meeting
   d) perform a dry run
   e) applicable O H & S Regulations
   f) company Safety Policies
   g) list of all involved parties

B. Elements of a Lift Plan

1. Demonstrate the ability to participate in a pre-operational meeting by planning lifts of various degrees of complexity using information normally available on a work site.
2. State the purpose of site blue prints in preparing a lift plan.
3. State the purpose of engineering drawings in preparing a lift plan.
4. List the participants normally involved in a pre-lift on site meeting.
5. State the elements of a standard lift plan:
   a) lift criteria
   b) verification of crane capacity
   c) determine pick location – radius
   d) verify and note locations of all obstructions
   e) determine if any overlap zones exist
   f) designate a signaller
   g) establish a communications method
   h) ensure proper rigging is utilized
   i) consider weather conditions
   j) verify lift placement location – radius

C. On-Site Communication

1. Demonstrate the ability to obtain and communicate information pertinent to the daily operations and the lifts involved.
2. State which parties on a job site might be contacted to supply or determine a schedule of daily operations.
3. State how site changes would be identified.
4. State how hazards would be identified.
5. State and discuss the purposes for identifying site changes and hazards.
6. Confirm lift plan with all involved parties noting changes, if any.

D. Determine the Gross Load

1. Have the ability to determine the weight of load and gross load.
2. Demonstrate how to determine a load weight through:
   a) engineered drawings
   b) load specifications
   c) bills of lading
   d) calculation
3. Given various loads, accurately determine their weights.
4. State the procedure for determining the gross load on a tower crane.
5. Define and discuss gross load vs. gross capacity.

E. Determine Tower Crane Capacity

1. Have the ability to identify rigging requirements and determine crane capacity.
2. State the procedure used to select the proper:
   a) slings
   b) equalizer beams
   c) spreader beams
   d) hardware
   e) special attachments
3. State the procedure used to determine a tower crane's capacity.
4. Given a set of tower crane load charts and lift information, determine whether or not the lift is possible.

F. Select A Crane Configuration

1. Have the ability to select appropriate crane configuration and attachments.
2. Determine the following given various lift scenarios:
   a) parts of line
   b) crane configurations
   c) boom (jib)
   d) transmission range
   e) tower height
   f) maximum working radius

G. Lifting Personnel

1. Have an understanding of how to prepare for lift using cranes equipped with personnel buckets or suspended platforms according to O H & S regulations and manufacturer recommendations.
2. Discuss O H & S Regulations pertaining to personnel buckets.
3. Given engineered drawings pertaining to personnel baskets and suspended platforms, extract information relevant to hoisting.
4. State how to obtain and verify a personnel basket and/or suspended platform inspection report.
5. Demonstrate inspection procedures for personnel baskets, work platforms, fall arrest systems and full body harnesses.
6. State how hoisting personnel affects a tower crane's capacity charts.
7. Given various personnel hoisting scenarios derate a tower crane's gross capacity accordingly.

H. Special Lift Preparation

1. Have the ability to prepare for specialty lifts and operations according to O H & S and manufacturer recommendations.
2. Create a lift plan for the following given lift scenarios:
   a) production lifts
   b) heavy lifts
   c) multiple lifts

SECTION FIVE:..... PRE-LIFT PLANNING AND RIGGING ..... 30 HOURS

A. Determine Safe Working Loads

1. Demonstrate the ability to identify, calculate and determine required rigging according to manufacturer and rigging manuals in accordance with O H & S.
2. Demonstrate the appropriate procedures for calculating the Safe Working Load (SWL) using manufacturer supplied nominal breaking strengths for:
   a) wire rope used for slings, bridles, standing lines and running lines
   b) chain used for slings and bridles
3. State the criteria used to select the appropriate hardware.
4. State the criteria used to select the appropriate safety devices.
5. Given various objects to lift:
   a) calculate the appropriate size, length and type of sling
   b) select the appropriate hardware
   c) select the appropriate safety devices

B. Inspect Rigging Equipment

1. Demonstrate the ability to inspect rigging equipment in accordance with manufacturer's recommendations, rigging and supplier manuals and O H & S.
2. State the criteria for removing rigging from service according to O H & S.
3. State the procedures for removing rigging from service.
4. Demonstrate the ability to identify frayed, cut, damaged and worn rigging equipment.
5. Discuss when repairs to rigging equipment would be acceptable and when they would not.
6. Discuss procedures for replacing various types of safety clips found on rigging equipment.

C. Wire Rope Inspection

1. Demonstrate the ability to inspect the wire rope for integrity and correct installation in accordance with manufacturer specifications and O H & S.
2. Describe types and characteristics of wire ropes used in craning.
3. Inspect wire ropes for frayed cable, broken strands, lubrications, excessive wear, bird caging, kinking, flattening and proper spooling.
4. Locate and interpret manufacturer's certificate of origin.
5. Ensure that wire rope is the correct length and diameter.
6. Ensure that wire rope is installed according to manufacturer specifications and O H & S.
7. Describe new cable installation procedure.
8. Record inspection and defects in logbook.
9. Report deficiencies to appropriate personnel.
10. Perform maintenance procedures for wire rope on a given crane.

D. Wire Rope Component Inspection

1. Demonstrate the ability to inspect wire rope components in accordance with manufacturer specifications and O H & S.
2. Identify rope guides, drums, blocks, hooks, sheaves, wedge and socket termination.
3. Inspect drum for proper installation of cable.
4. Inspect components and connections for defects.
5. Describe appropriate repair or replacement procedures and perform when required.
6. Record inspection and defects in logbook.
7. Report deficiencies to appropriate personnel.

E. Lubricate Wire Rope

1. Demonstrate the ability to lubricate wire rope in accordance with wire rope manufacturer specifications and O H & S.
2. Demonstrate a knowledge of wire rope lubrication requirements by:
   a) stating the criteria for lubricating wire rope
   b) identifying the wire ropes requiring lubrication
3. Perform the required wire rope lubrication utilizing the appropriate application method.
4. Record the lubrication in the logbook.

F. Inspect Lifting Devices

1. Demonstrate the ability to select, inspect and identify defects in lifting devices in accordance with manufacturer recommendations, engineered drawings and O H & S.
2. Given a selection of lifting devices, demonstrate how to inspect the devices according to O H & S and manufacturer's specifications.
3. Complete an inspection report form.
4. Demonstrate the ability to match a lifting device to a specific task.
5. Demonstrate how to perform routine maintenance on lifting devices.

G. Select Rigging Equipment

1. Have the ability to select rigging equipment in accordance with manufacturer specifications and O H & S.
2. Demonstrate how to calculate load weights.
3. Demonstrate the procedures for determining a load's centre of gravity.
4. Given a load to lift, select the appropriate rigging to do the job and give reasons for the selection.

H. Perform Rigging

1. Have the ability to use slinging and rigging techniques for a variety of loads according to manufacturer specifications and O H & S.
2. Having selected the appropriate slinging arrangement for given loads, demonstrate how to properly install the slings to lift the load safely.
3. Demonstrate how to properly install rigging hardware to safely lift a variety of given loads.

I. Maintain And Store Rigging Equipment

1. Demonstrate the ability to maintain and store slinging and rigging equipment according to manufacturer specifications and O H & S.
2. Demonstrate how to perform routine maintenance on various types of rigging hardware.
3. Demonstrate the proper procedures for storing rigging equipment.
4. State the procedures for removing rigging from service.

SECTION SIX: ..... OPERATE HAMMERHEAD CRANES ..... 34 HOURS

A. Interpret Operating Manuals

1. Demonstrate the ability to interpret manufacturer manuals to ensure safe operation of the crane in accordance with manufacturer recommendations, specifications and O H & S.
2. Utilizing the manufacturer's manual for a given tower crane, demonstrate the ability to identify:
   a) controls location
   b) safety devices
   c) emergency devices
   d) safe operating procedures
3. Demonstrate the ability to verify the crane's gross capacity at given radii.

B. Program On-Board Computer Systems

1. Demonstrate an understanding of the process to program the on-board computer system for a given lift and crane configuration in accordance with manufacturer recommendations.
2. State the generic procedure for programming a tower crane's load moment indicator (LMI).
3. Given a crane configuration and lift scenario, program an LMI simulator (if available).

C. Perform Pre-Operational Checks

1. Demonstrate the ability to perform a daily pre-operational check in accordance with manufacturer recommendations and O H & S.
2. State the step-by-step procedure for performing a pre-operational inspection.
3. Demonstrate the ability to perform a complete daily pre-operational inspection.
4. Record the pre-operational inspection findings in the tower cranes logbook.

D. Perform Trolley Travel Operations Without A Load

1. Demonstrate the ability to travel the trolley in both directions while maintaining control of the hook block in accordance with crane manufacturer recommendations.
2. Demonstrate the ability to use the trolley function by:
   a) locating and engaging the trolley control lever
   b) trolley out at various speeds
   c) trolley in at various speeds
3. Maintain control of the hook block in a safe manner through all trolley functions.

E. Perform Trolley Travel Operations With A Load

1. Demonstrate the ability to travel the trolley while maintaining control of the hook block and load in accordance with crane manufacturer recommendations.
2. Demonstrate the ability to use the trolley function under load by:
   a) locating and engaging the trolley control lever
   b) trolleying out at various speeds
   c) trolleying in at various speeds
3. Maintain control of the hook block and the load in a safe manner through all trolley functions.

F. Perform Slewing Operations Without A Load

1. Demonstrate the ability to swing and stop the jib in both directions while maintaining control of the hook block in a safe and efficient manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the slewing function by:
   a) locating and engaging the swing control lever
   b) slewing to the left at various speeds
   c) stopping the slewing motion
   d) applying the holding brake
   e) slewing to the right at various speeds
   f) stopping the slewing motion
   g) applying the holding brake
3. Maintain control of the hook block in a safe manner through all slewing functions.

G. Perform Slewing Operations With A Load

1. Demonstrate the ability to swing and stop the jib in both directions while maintaining control of the hook block in a safe and efficient manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the slewing function under load by:
   a) locating and engaging the swing control lever
   b) slewing to the left at various speeds
   c) stopping the slewing motion
   d) applying the holding brake
   e) slewing to the right at various speeds
   f) stopping the slewing motion
   g) applying the holding brake
3. Maintain control of the hook block in a safe manner through all slewing functions.

H. Perform Hoisting Operations Without A Load

1. Demonstrate the ability to safely raise, lower and stop the hook block in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the hoisting function by:
   a) locating and engaging the hoisting control lever
   b) lower the hook block at various speeds
   c) raise the hook block at various speed
   d) stop the hook block at the end of each function

3. Maintain control of the hook block in a safe manner through all hoisting functions.

I. Perform Hoisting Operations With A Load

1. Demonstrate the ability to safely hoist, lower and stop the load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the hoisting function under load by:
   a) locating and engaging the hoisting control lever
   b) raise the hook block and load at various speeds
   c) lower the hook block and load at various speeds
   d) stop the hook block and load at the end of each function
3. Maintain control of the hook block and load in a safe manner through all hoisting functions.

J. Perform Crane Travel Operations Without A Load

1. Demonstrate the ability to safely travel a crane without a load in a controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to move a travelling tower crane by:
   a) check the travel track for any obstructions
   b) locating and engaging the crane travel control lever
   c) travel the crane in both directions without a load at various speeds
   d) stop the crane at the end of each travel function
3. Maintain control of the hook block in a safe manner through all crane travel functions.

K. Perform Crane Travel Operations With A Load

1. Demonstrate the ability to safely travel a crane with a load in a controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to move a travelling tower crane under load by:
   a) check the travel track for any obstructions
   b) locating and engaging the crane travel control lever
   c) travel the crane in both directions with a load at various speeds
   d) stop the crane at the end of each travel function
3. Maintain control of the hook block and load in a safe manner through all crane travel functions.

L. Perform All Crane Functions Simultaneously Without A Load

1. Demonstrate the ability to use multiple controls to trolley, swing, hoist and travel the crane without a load in a safe and controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to coordinate use of multiple tower crane functions in a safe manner by:
   a) simultaneously engaging the trolley, swing, hoist and travel (if applicable) functions at various speeds without a load in all directions
   b) stop the crane at the end of each function
3. Maintain control of the hook block in a safe manner through all crane functions.

M. Perform All Crane Functions Simultaneously With A Load

1. Demonstrate the ability to use multiple controls to trolley, swing, hoist and travel a crane with a load in a safe and controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to coordinate use of multiple tower crane functions under load in a safe manner by:
   a) simultaneously engaging the trolley, swing, hoist and travel (if applicable) functions at various speeds without a load in all directions
   b) stop the crane at the end of each function
3. Maintain control of the hook block and load in a safe manner through all crane functions.

N. Leaving Tower Cranes Unattended For Short Periods

1. Demonstrate the ability to leave a crane unattended in a safe and secure manner in accordance with manufacturer recommendations, engineered drawings and O H & S.
2. State the step-by-step procedure for leaving a tower crane unattended as per the manufacturers' recommendations, O H & S and job site requirements.
3. Perform this procedure as required.

O. Leaving Tower Cranes Unattended For Extended Periods

1. Demonstrate the ability to secure crane for extended periods of time in a safe manner according to manufacturer recommendations, engineered drawings and O H & S.
2. State the step-by-step procedure for leaving a tower crane unattended as per the manufacturers' recommendations, O H & S and job site requirements.
3. Identify and discuss the differences between leaving a tower crane unattended by extended periods as opposed to short periods.
4. Perform procedure as required.

SECTION SEVEN: ..... OPERATE LUFFER CRANES ..... 8 HOURS

A. Interpret Operating Manuals

1. Demonstrate the ability to interpret manufacturer manuals to ensure safe operation of a luffer crane in accordance with manufacturer recommendations, specifications and O H & S.
2. Utilizing the manufacturer's manual for a given tower crane, demonstrate the ability to identify:
   a) controls location
   b) safety devices
   c) emergency devices
   d) safe operating procedures
3. Demonstrate the ability to verify the crane's gross capacity at given radii.
4. Demonstrate the ability to plan and prepare for crane maintenance in accordance with manufacturer specifications, CSAO, WHMIS and O H & S.
5. Demonstrate the ability to identify the maintenance requirements for a given crane utilizing:
   a) manufacturer's manuals
   b) CSAO, WHMIS and O H & S
6. State the methods used to report various maintenance items needed and/or performed for a given tower crane.

7. Demonstrate the ability to select replacement components from the manufacturer's manuals.
8. Identify special tools required for specific maintenance tasks.
9. Demonstrate the ability to assemble special tools for use.

B. Program On-Board Computer Systems

1. Demonstrate an understanding of the process to program the on-board computer system for a given lift and crane configuration in accordance with manufacturer recommendations.
2. State the generic procedure for programming a tower crane's load moment indicator (LMI).
3. Given a crane configuration and lift scenario, program an LMI simulator (if available).

C. Perform Pre-Operational Checks

1. Demonstrate the ability to perform a daily pre-operational check in accordance with manufacturer recommendations and O H & S.
2. State the step-by-step procedure for performing a pre-operational inspection.
3. Demonstrate the ability to perform a complete daily pre-operational inspection.
4. Record the pre-operational inspection findings in the tower cranes logbook.

D. Perform Luffing Operations Without A Load

1. Demonstrate the ability to boom up and down while maintaining control of the hook block in accordance with crane manufacturer recommendations.
2. Demonstrate the ability to use the boom/jib function by:
   a) locating and engaging the boom/jib control lever
   b) boom/jib up at various speeds
   c) boom/jib down at various speeds
3. Maintain control of the boom and hook block in a safe manner through all boom/jib functions.

E. Perform Luffing Operations With A Load

1. Demonstrate the ability to boom up and down while maintaining control of the load in accordance with crane manufacturer recommendations.
2. Demonstrate the ability to use the boom/jib function under load by:
   a) locating and engaging the boom/jib control lever
   b) boom/jib up at various speeds
   c) boom/jib down at various speeds
3. Maintain control of the boom and hook block and the load in a safe manner through all boom/jib functions.

F. Perform Slewing Operations Without A Load

1. Demonstrate the ability to safely swing and stop the boom while maintaining control of the hook block in a safe and efficient manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the slewing function by:
   a) locating and engaging the swing control lever
   b) slewing to the left at various speeds
   c) stopping the slewing motion
   d) applying the holding brake

e) slewing to the right at various speeds
f) stopping the slewing motion
g) applying the holding brake

3. Maintain control of the boom and hook block in a safe manner through all slewing functions.

G. Perform Slewing Operations With A Load

1. Demonstrate the ability to safely swing and stop the boom while maintaining control of the load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the slewing function under load by:
   a) locating and engaging the swing control lever
   b) slewing to the left at various speeds
   c) stopping the slewing motion
   d) applying the holding brake
   e) slewing to the right at various speeds
   f) stopping the slewing motion
   g) applying the holding brake
3. Maintain control of the boom and hook block and load in a safe manner through all slewing functions.

H. Perform Hoisting Operations Without A Load

1. Demonstrate the ability to safely raise, lower and stop the hook block in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the hoisting function by:
   a) locating and engaging the hoisting control lever
   b) lower the hook block at various speeds
   c) raise the hook block at various speed
   d) stop the hook block at the end of each function
3. Maintain control of the boom and hook block in a safe manner through all hoisting functions.

I. Perform Hoisting Operations With A Load

1. Demonstrate the ability to safely raise, lower and stop the load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the hoisting function with a load by:
   a) locating and engaging the hoisting control lever
   b) raise the hook block and load at various speeds
   c) lower the hook block and load at various speeds
   d) stop the hook block and load at the end of each function
3. Maintain control of the boom and hook block and load in a safe manner through all hoisting functions.

J. Perform Luff/Boom Up-Hoist Down Operations Without A Load

1. Demonstrate the ability to safely boom up and hoist down simultaneously without a load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the luffing and hoist controls simultaneously by:
   a) locating and engaging the luffing and hoist controls
   b) luff/boom-up and hoist down simultaneously at various speeds without a load

c) stop the hook block at the end of each movement
d) maintain the desired hook height throughout each movement
e) maintain control of the boom and hook block in a safe manner throughout each movement

K. Perform Luff/Boom Up-Hoist Down Operations With A Load

1. Demonstrate the ability to safely boom up and hoist down simultaneously with a load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the luffing and hoist controls simultaneously under load by:
   a) locating and engaging the luffing and hoist controls
   b) luff/boom-up and hoist down with a load simultaneously at various speeds
   c) stop boom and hook block at the end of each movement
   d) maintain the desired hook height throughout each movement
   e) maintain control of the boom, hook block and load in a safe manner throughout each movement

L. Perform Luff/Boom Down-Hoist Up Operations Without A Load

1. Demonstrate the ability to safely boom down and hoist down simultaneously without a load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the luffing and hoist controls simultaneously by:
   a) locating and engaging the luffing and hoist controls
   b) luff/boom-down and hoist down simultaneously at various speeds without a load
   c) stop boom and hook block at the end of each movement
   d) maintain the desired hook height throughout each movement
   e) maintain control of the boom, hook block and load in a safe manner throughout each movement

M. Perform Luff/Boom Down-Hoist Up Operations With A Load

1. Demonstrate the ability to safely boom down and hoist down simultaneously with a load in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to use the luffing and hoist controls simultaneously under load by:
   a) locating and engaging the luffing and hoist controls
   b) luff/boom-down and hoist up with a load simultaneously at various speeds
   c) stop the boom and hook block at the end of each movement
   d) maintain the desired hook height throughout each movement
   e) maintain control of the boom, hook block and load in a safe manner throughout each movement

N. Perform Crane Travel Operation Without A Load

1. Demonstrate the ability to safely travel a luffer crane without a load in a controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to move a travelling tower crane by:
   a) check the travel track for any obstructions
   b) locating and engaging the crane travel control lever
   c) travel the crane in both directions without a load at various speeds
   d) stop the crane at the end of each travel function

e) maintain control of the hook block in a safe manner throughout all crane travel functions

O. Perform Crane Travel Operations With A Load

1. Demonstrate the ability to safely travel a luffer crane with a load in a controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to move a travelling tower crane under load by:
   a) check the travel track for any obstructions
   b) locating and engaging the crane travel control lever
   c) travel the crane in both directions with a load at various speeds
   d) stop the crane at the end of each travel function
   e) maintain control of the hook block and load in a safe manner throughout all crane travel functions

P. Perform All Crane Functions Simultaneously Without A Load

1. Demonstrate the ability to use multiple controls to boom, swing, hoist and travel a luffer crane without a load in a safe and controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to coordinate use of multiple tower crane functions in a safe manner by:
   a) simultaneously engaging the boom/jib, swing, hoist and travel (if applicable) functions at various speeds without a load in all directions
   b) stop the crane at the end of each function
   c) maintain control of the hook block in a safe manner throughout all crane functions

Q. Perform All Crane Functions Simultaneously With A Load

1. Demonstrate the ability to use multiple controls to boom, swing, hoist and travel a luffer crane with a load in a safe and controlled manner in accordance with manufacturer recommendations and O H & S.
2. Demonstrate the ability to coordinate use of multiple tower crane functions under load in a safe manner by:
   a) simultaneously engaging the boom/jib, swing, hoist and travel (if applicable) functions at various speeds with a load in all directions
   b) stop the crane at the end of each function
   c) maintain control of the hook block and load in a safe manner throughout all crane functions

R. Leaving Tower Cranes Unattended For Short Periods

1. Demonstrate the ability to leave a crane unattended in a safe and secure manner in accordance with manufacturer recommendations, engineered drawings and O H & S.
2. State the step-by-step procedure for leaving a tower crane unattended as per the manufacturers' recommendations, O H & S and job site requirements.
3. Perform this procedure as required.

S. Leaving Tower Cranes Unattended For Extended Periods

1. Demonstrate the ability to secure crane for extended periods of time in a safe manner according to manufacturer recommendations, engineered drawings and O H & S.
2. State the step-by-step procedure for leaving a tower crane unattended as per the manufacturers' recommendations, O H & S and job site requirements.
3. Identify and discuss the differences between leaving a tower crane unattended by extended periods as opposed to short periods.
4. Perform procedure as required.

SECTION EIGHT:..... CLIMB CRANES (INTERNAL) .....22 HOURS

A. Interpret Tower Crane Climbing Reference Material

1. Identify procedures, equipment and components used to climb from all available reference material.
2. Identify the equipment used to climb (raise) a given crane using the crane manufacturer's manual.
3. Identify and briefly describe the climbing equipment components for a given crane.
4. State, in sequence, the procedures used to climb a given crane.

B. Prepare A Tower Crane For Climbing

1. Demonstrate the ability to prepare the crane for climbing in accordance with manufacturer recommendations and specifications, engineered drawings and O H & S.
2. Demonstrate the ability to interpret engineered drawings used to install the shoring and bracing system.
3. State the procedures utilized to prepare a given crane for climbing.
4. Check to ensure proper installation of shoring and bracing system.
5. Check to ensure that the power cable's (cabtype) length is sufficient for operation at the new elevation.

C. Assemble The Climbing Unit

1. Demonstrate the ability to install, assemble and inspect climbing apparatus and components in accordance with manufacturer recommendations and specifications, engineered drawings and O H & S.
2. Given a tower crane climbing unit, demonstrate the ability to:
   a) assemble the components
   b) install the climbing equipment
   c) inspect the hydraulic system for leaks, pressure and proper functioning

D. Balance The Crane

1. Demonstrate the ability to balance and lock the crane prior to climbing operations in accordance with manufacturer recommendations and specifications, engineered drawings and O H & S.
2. State procedures used to balance:
   a) a hammerhead tower crane
   b) a luffing jib tower crane

E. Climb (Raise) The Crane

1. Demonstrate the ability to raise the crane in a safe manner in accordance with crane manufacturer recommendations and specifications and O H & S.
2. Demonstrate the ability to raise the elevation of a tower crane by (if available):
   a) engaging the hydraulic system to the climbing apparatus
   b) activating the hydraulic system to begin the climbing process
   c) check to ensure the crane is clear of all obstructions during the climbing process
   d) ensure climbing pawls engage at the appropriate piston range
   e) retract climbing piston and repeat procedure until the desired height is reached

F. Set And Secure The Raised Crane

1. Demonstrate the ability to support and secure the raised crane in accordance with manufacturer recommendations, engineered drawings and O H & S.
2. Demonstrate the ability to install the support devices for a given tower crane upon completion of the climbing process.
3. State the procedure(s) used to plumb a given tower crane after the climbing process is complete.
4. Demonstrate how to secure the wedges once the tower has been plumbed.
5. Demonstrate the ability to disconnect and/or remove the climbing apparatus.

G. Inspect The Raised Crane

1. Demonstrate the ability to ensure that the crane is secure, plumb and free from obstructions in accordance with manufacturer recommendations and specifications, engineered drawings and O H & S.
2. State the procedures used to ensure the tower crane is plumb.
3. State the procedures used to ensure the tower crane is secure.
4. State the procedures used to ensure there are no obstructions in the tower crane's new position.

H. Perform Function Tests

1. Demonstrate the ability to verify that the crane has been correctly raised and secured. Perform required tests in accordance with manufacturer recommendations and specifications, engineered drawings, job site requirements and O H & S.
2. State the procedures used to ensure the tower crane is secure.
3. State the procedures used to ensure there are no obstructions.
4. State the procedures for performing the load moment overload test.
5. State the procedures for adjusting limit switches as required.
6. Demonstrate the ability to record all results, including the climbing (raising) of the tower crane itself, in the logbook.

SECTION NINE: ..... REVIEW ..... 6 HOURS

1. Maintain Tower Crane Structural Components
2. Have the ability to maintain crane structure and components in accordance with manufacturer specifications and O H & S.
3. Demonstrate the ability to perform required routine structural maintenance by:
   a) checking to ensure bolts are torqued according to manufacturer's specifications
   b) checking to ensure the horizontal support system is secure
   c) checking to ensure that the tower support wedges are firmly in place and secured
   d) checking to ensure that pins and cotter keys are properly installed
   e) checking to ensure the guardrails are safely installed and secured
   f) cleaning, priming and painting corroded areas as needed

B. Maintain Tower Crane Mechanical Components

1. Have the ability to maintain mechanical systems and components in accordance with manufacturer specifications and O H & S.
2. Demonstrate the ability to perform required routine mechanical maintenance by:
   a) adjusting brakes, rollers and cables
   b) replacing belts
   c) servicing gearbox and hydraulic tank breathers
   d) topping up fluids
3. Grease fittings and open gears.

C. Perform Function Tests

1. Have the ability to test crane performance following repair and break in period in accordance with manufacturer specifications and O H & S.
2. State the procedures used to test and return to service parts or components following maintenance according to the manufacturer's specifications and O H & S.
3. Demonstrate the ability to perform performance tests on parts or components after maintenance.
4. State the purpose for break in procedures for parts and components following maintenance.
5. Demonstrate the ability to perform break in procedures for parts and components following maintenance.

D. Update The Crane Logbook

1. Have the ability to complete crane logbook in accordance with manufacturer specifications and O H & S.
2. State the O H & S regulations governing tower crane logbook entries.
3. Demonstrate the ability to properly record logbook entries that are:
   a) concise
   b) accurate
   c) legible

Excellence through training and experience

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